GC Fuji II LC
LIGHT-CURED GLASS IONOMER CEMENT FOR RESTORATIVE FILLING
1-1PKG. POWDER 15g LIQUID 8g (6.8ml)
STORAGE
STORE IN A COOL AND DARK PLACE (4~25°C) (39.2~77.0°F).
GC CORPORATION
Fuji II LC LIQUID 8g (6.8ml)
Fuji II LC POWDER 15g
A2

LCDR ART GEORGE

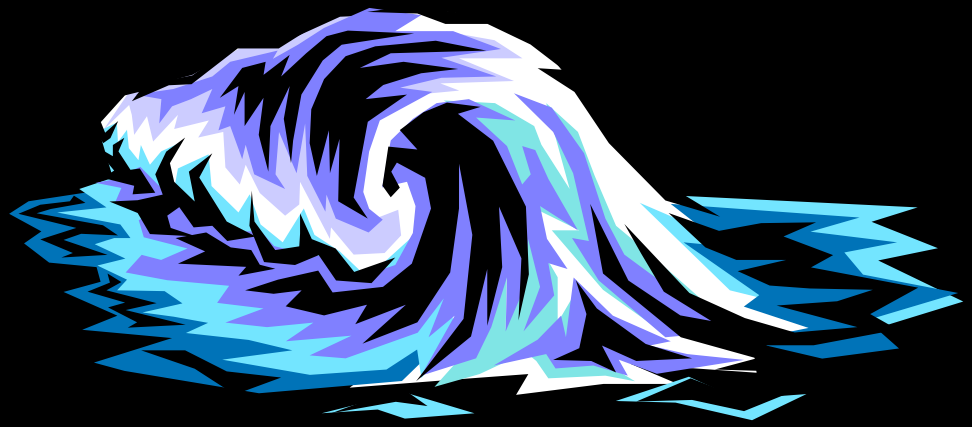
LCDR ART GEORGE

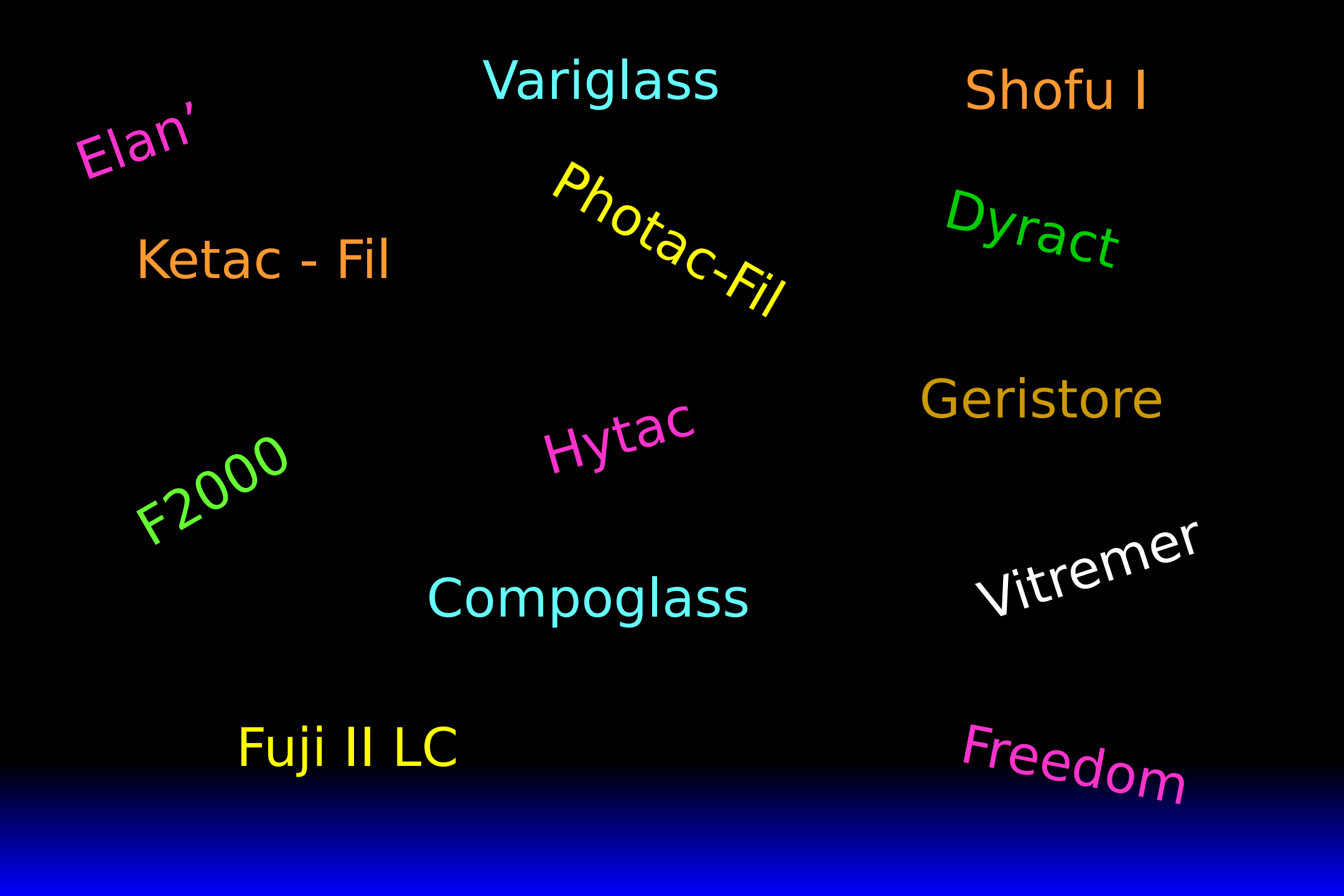
TIDAL WAVE

OF

“NEW & IMPROVED”

MATERIALS




Elan'
Variglass
Shofu I
Photac-Fil
Dyract
Ketac - Fil
Geristore
F2000
Hytac
Compoglass
Vitremer
Fuji II LC
Freedom

TODAY'S RESTORATIVE

IS

A

THINKING

MAN'S GAME

PURPOSE

- CLASSIFY THE VARIOUS MATERIALS
- UNDERSTAND THE BASIC CHEMISTRY
- DISCOVER WHEN AND HOW TO USE THESE MATERIALS

BASIC DEFINITIONS

McLean / Nicholson / Wilson (1994)

I. GLASS-IONOMERS
II. RESIN-MODIFIED GLASS IONOMERS
III. POLYACID-MODIFIED RESIN COMPOSITES

GLASS IONOMERS

CONVENTIONAL GLASS IONOMERS

GLASS IONOMER CEMENTS

RESIN-MODIFIED GLASS IONOMERS

RESIN-MODIFIED GLASS IONOMERS

RESIN-MODIFIED GLASS IONOMERS

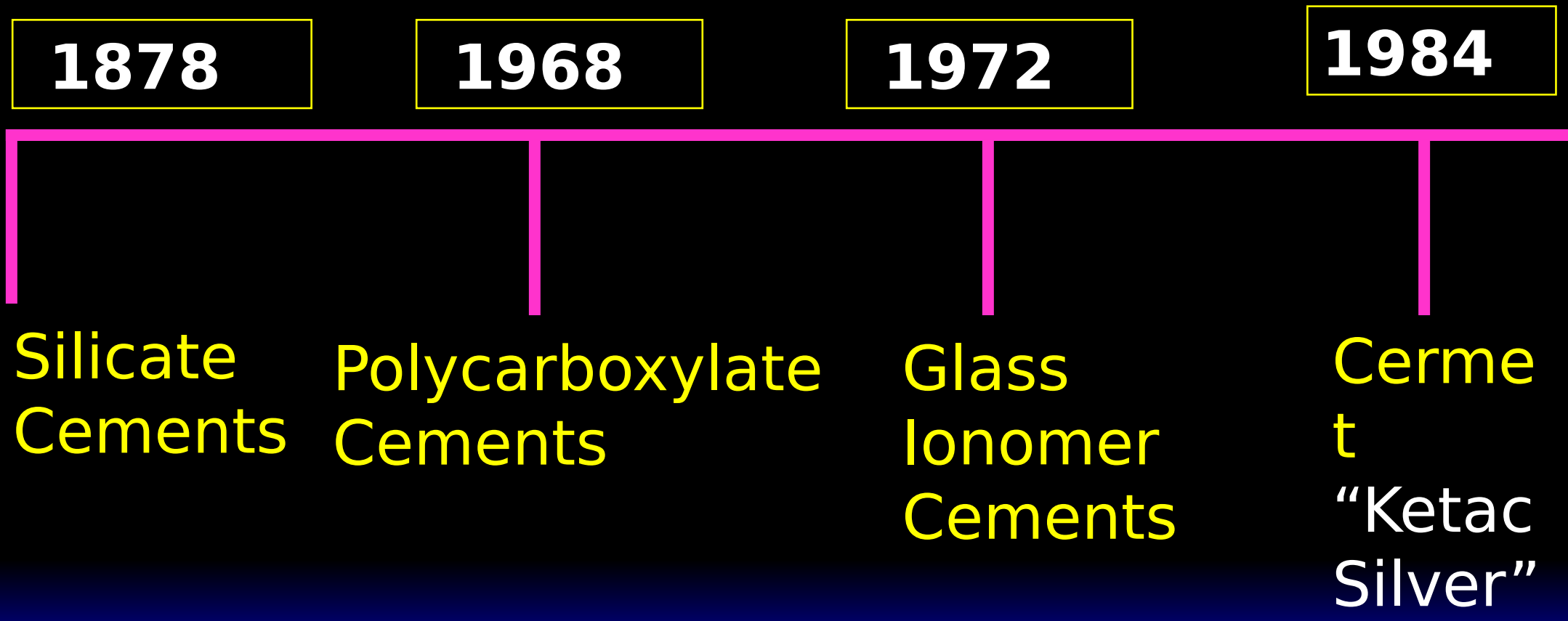
REINFORCED GLASS IONOMERS

RESIN-IONOMERS

POLYACID-MODIFIED RESIN COMPOSITES

COMPOMERS

HISTORICAL TIME LINE



HISTORICAL TIME LINE

1991

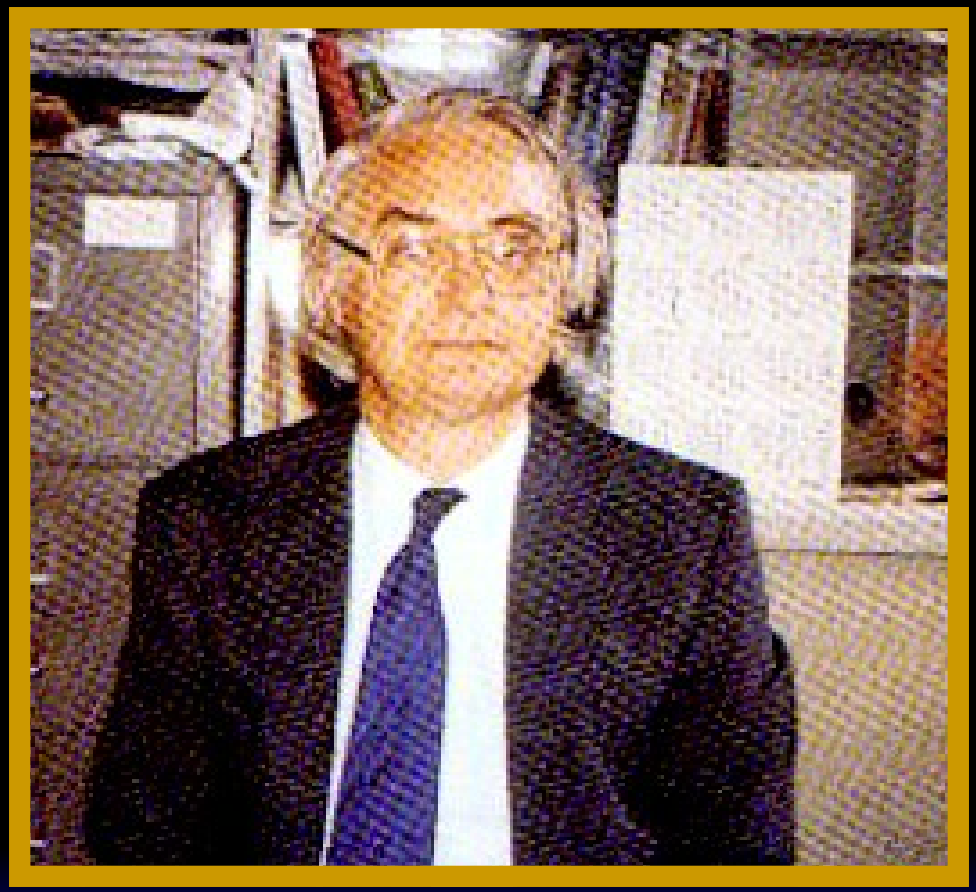
Resin-Modified
Glass Ionomers
"Vitrebond"

1993

Compomers
"Dyract"

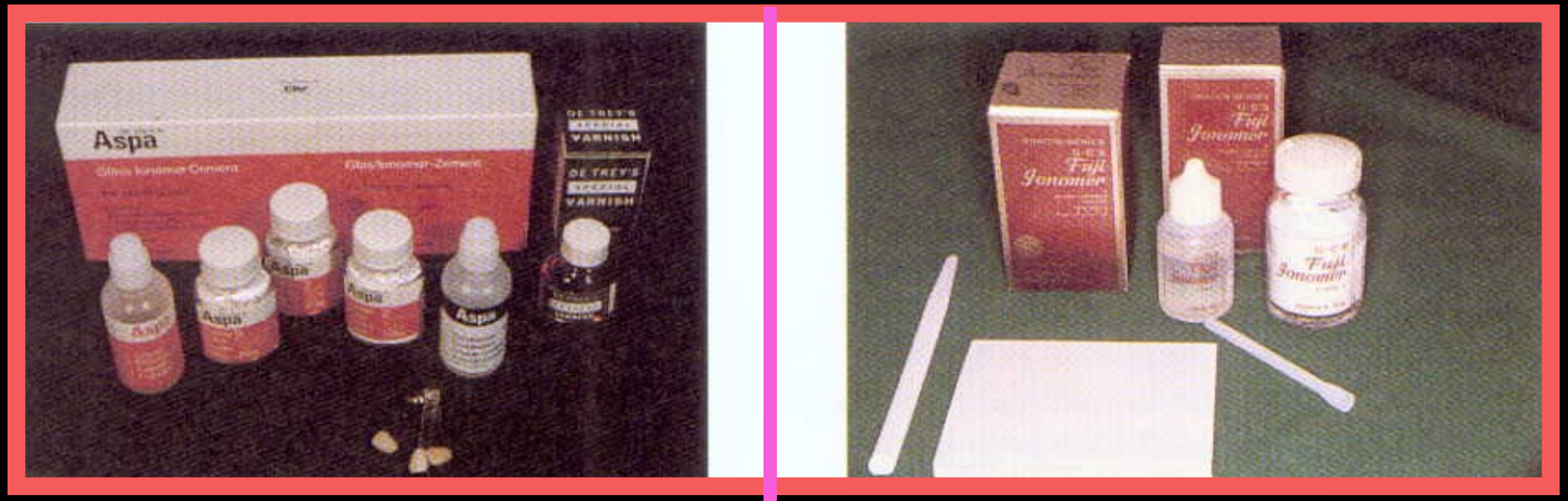
A CLOSER LOOK

EARLY DEVELOPMENT



DR.
WILSON

EARLY DEVELOPMENT



"Aspa"

FUJI IONOMER
TYPE I

EARLY DEVELOPMENT

EARLY DEVELOPMENT

CLASSIFICATIONS

- TYPE I - LUTING CEMENTS
- TYPE II - RESTORATIVES
- TYPE III - LINERS AND BASES
- TYPE IV - CORE BUILDUP

ADVANTAGES

- Tooth Colored
- Adheres Chemically To Enamel / Dentin
- Coefficient of Thermal Expansion - Tooth
- High Fluoride Release
- “Rechargeable”
- Less Shrinkage Than Composite

ADVANTAGES

- Biocompatible
- No Bonding Agent Required
- Resistant to Staining

RECOMMENDED USES

- CERVICAL LESIONS
- HIGH CARIES RISK PATIENTS

CLINICAL APPLICATION

- ANESTHESIA
- ISOLATION
- TOOTH PREARATION
- CONDITIONING
- RINSE & DRY
- KEEP THE TOOTH MOIST

CLINICAL APPLICATION

- PLACEMENT
- MATRIX
- PLACE BARRIER
- FINISHING
- REAPPLY BARRIER

DISADVANTAGES

- Technique Sensitive
- Moisture Sensitivity
- Cannot Be Placed in Stress Bearing Areas
- Low Tensile and Fracture Toughness
- Poor Wear Resistance
- Only Average Esthetics

GLASS IONOMER CEMENTS

- COMPOSITION
  - POWDER = CALCIUM FLUOROALUMINOSILICATE GLASS

Silicon	13.3%	Phosphorus	2.5%
Aluminum	13.3%	Fluoride	22.7%
Calcium	17.3%	Oxygen	28.0%
Sodium	1.6%		

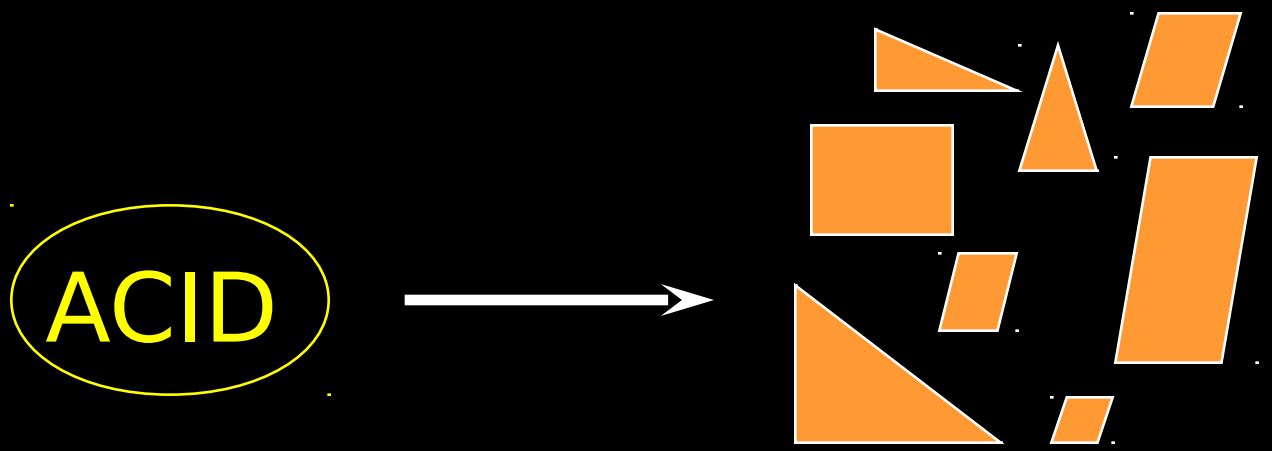
GLASS IONOMER CEMENTS

- COMPOSITION
  - LIQUID = POLYACRYLIC ACID OR
    - COPOLYMER OF ACRYLIC / MALEIC or ACRYLIC / ITACONIC
    - TARTARIC ACID
    - WATER

SETTING REACTION

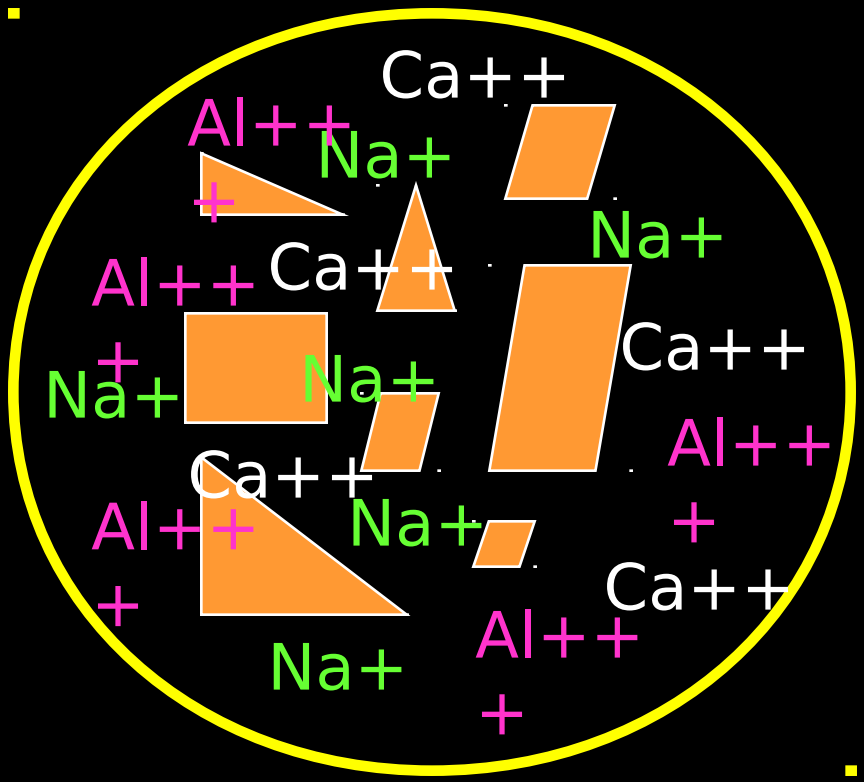
- DECOMPOSITION
- MIGRATION
- GELATION
- POST-SET HARDENING
- MATURATION

DECOMPOSITION



GLASS

MIGRATION



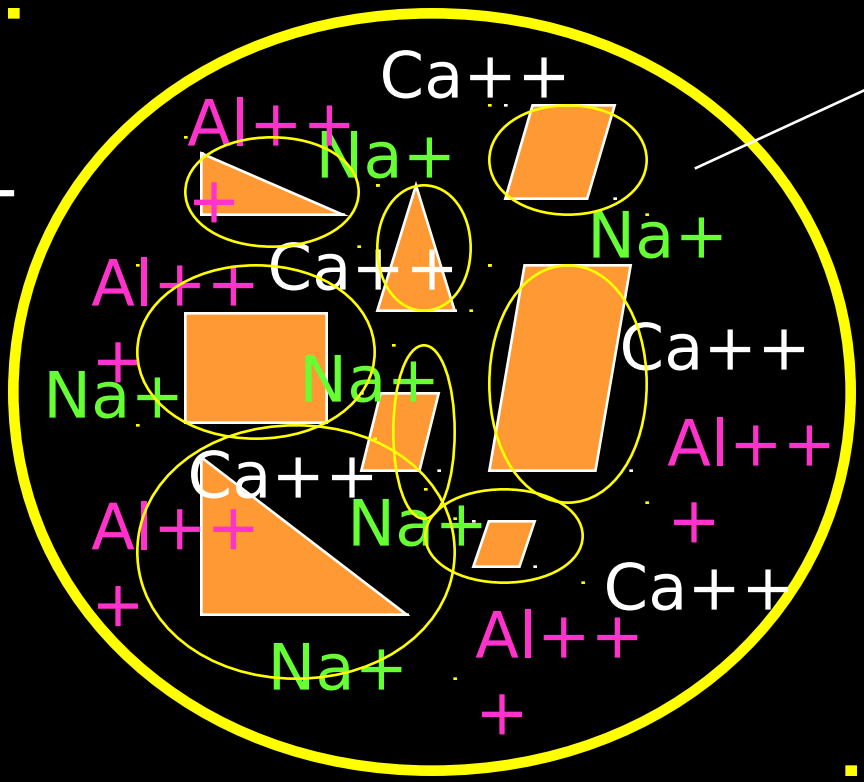
MIGRATION

THE ACID PENETRATES THE DISORGANIZED GLASS AND REACTS WITH Ca^{++} TO FORM A POLYSALT.

GELATION

1ST

CA^{++} POLYSALT

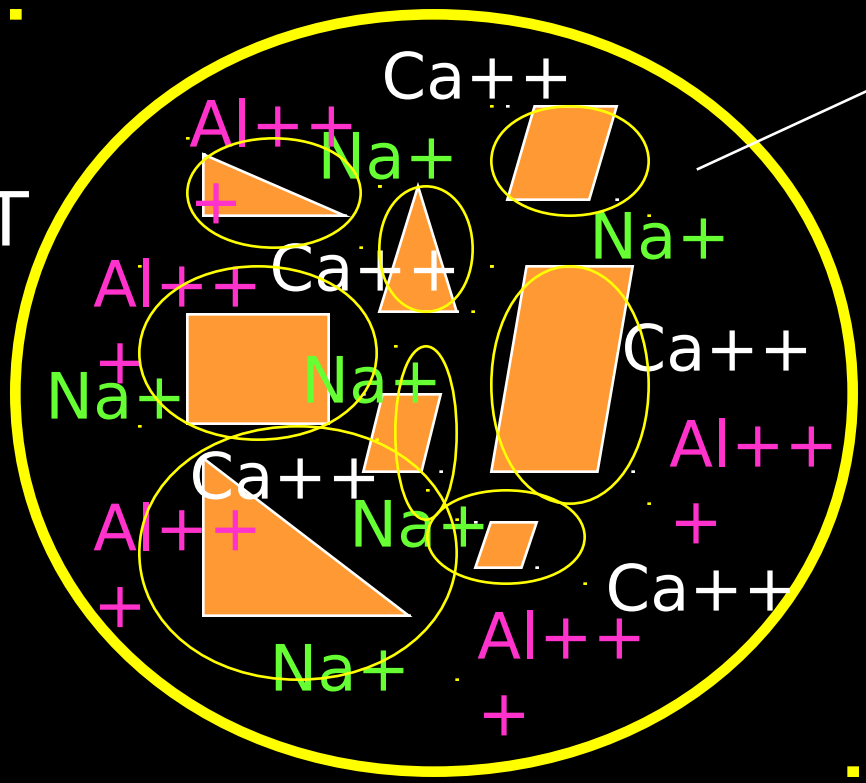


LAYER OF SILICA GEL

POST-SET HARDENING

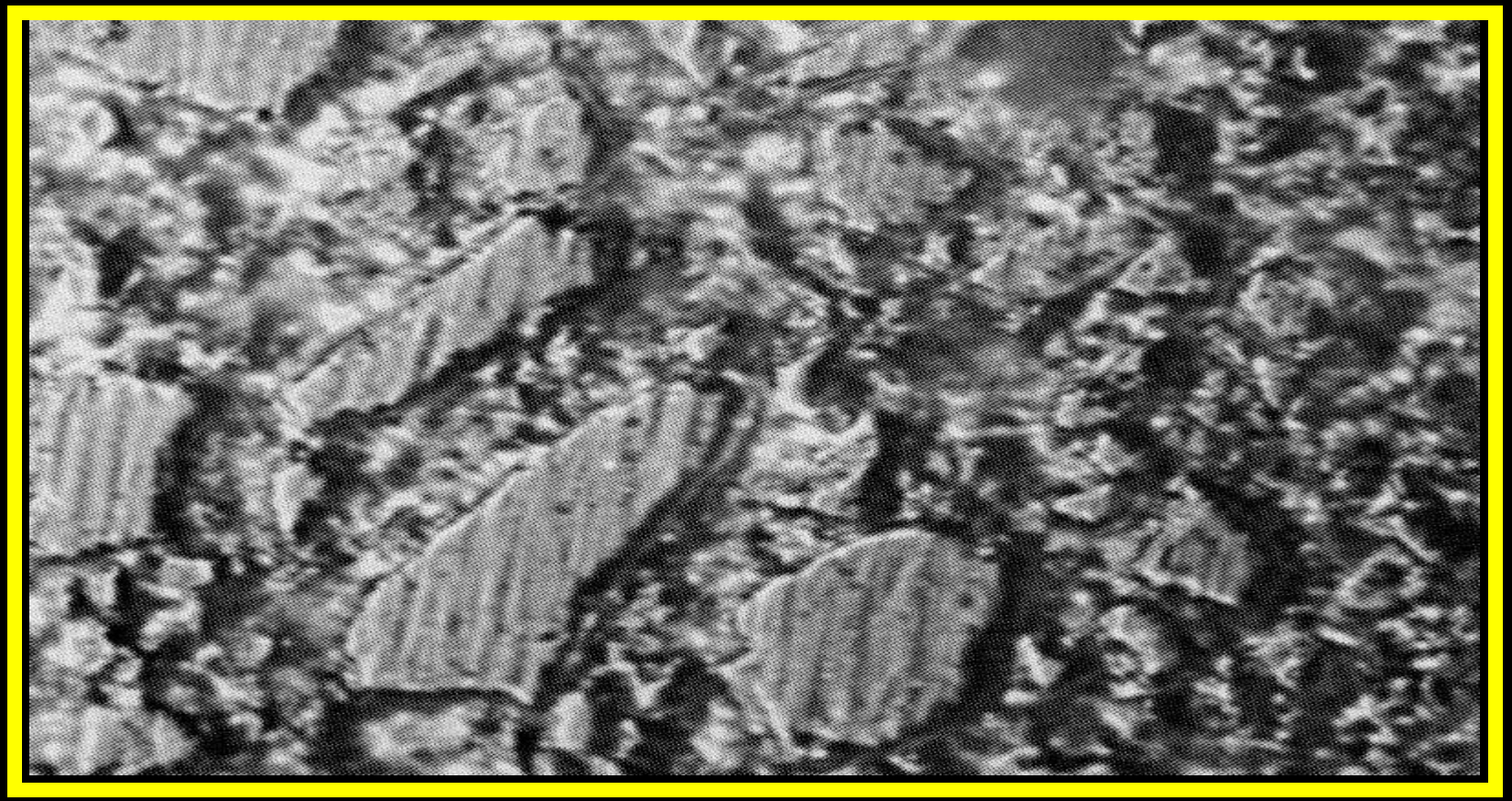
2ND

AL^{+++} POLYSALT



LAYER OF SILICA GEL

MATURATION



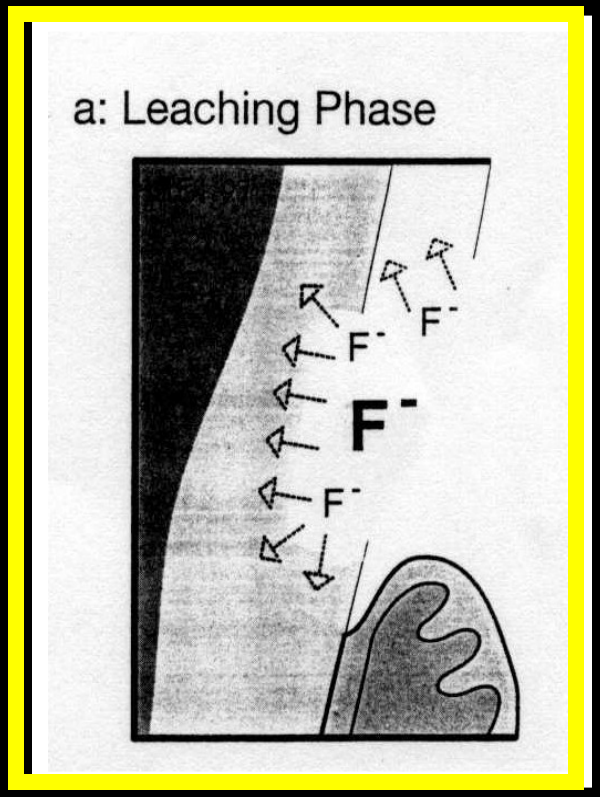
MATURATION

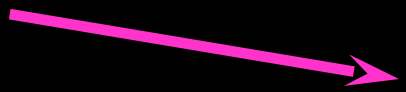
- Precipitation of Al^{+++} Salts Continues for 24 Hours
- The Setting Process Continues Thereafter But at a Very Slow Pace For Up To 1 Year
- Continued Formation of Polysalts
  - Hydration of the Polysalts
  - Expanded Gel Structure

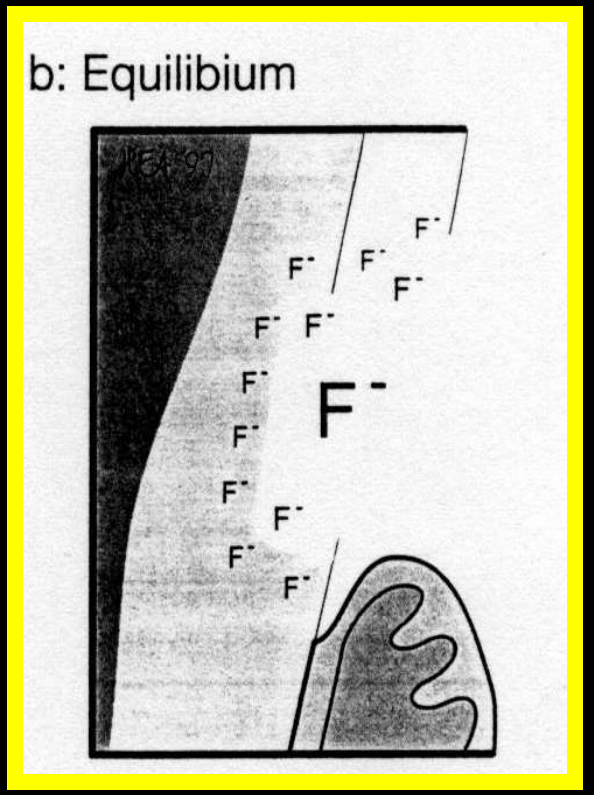
WHAT ABOUT THE FLUORIDE??

FLUORIDE IS NOT AN INTEGRAL PART OF THE MATRIX AND CAN BE RELEASED WITHOUT UPSETTING THE STRUCTURE OF THE CEMENT.

HOW DOES RECHARGING WORK?







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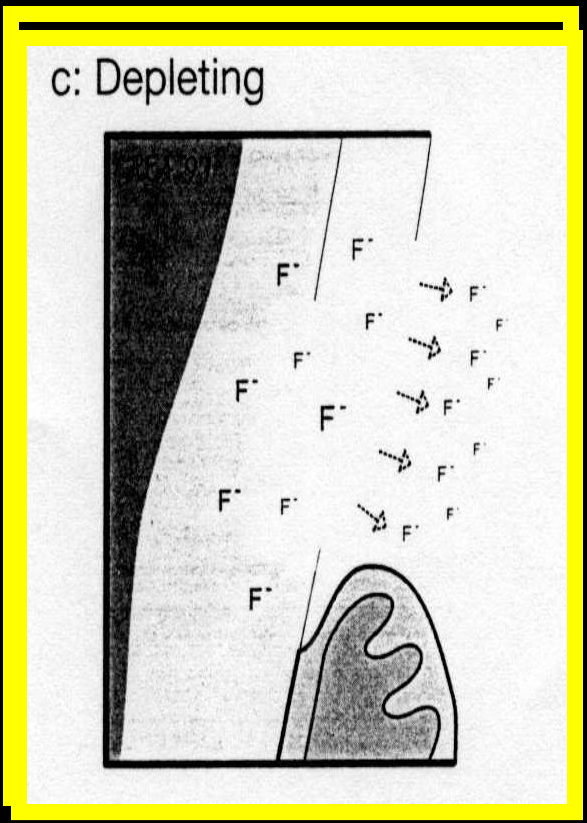
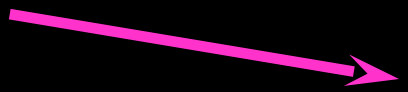
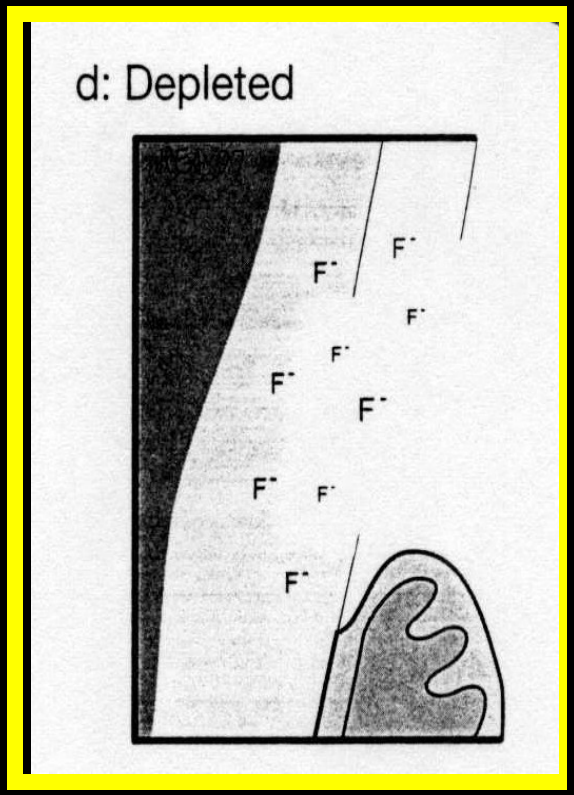
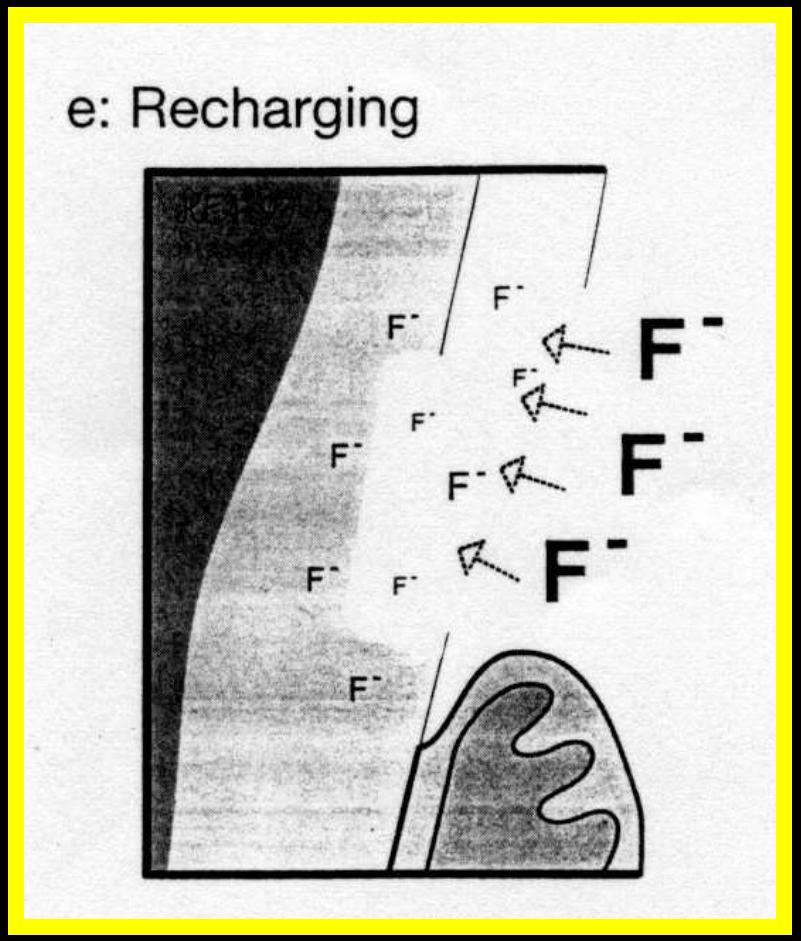






HOW DOES RECHARGING WORK?



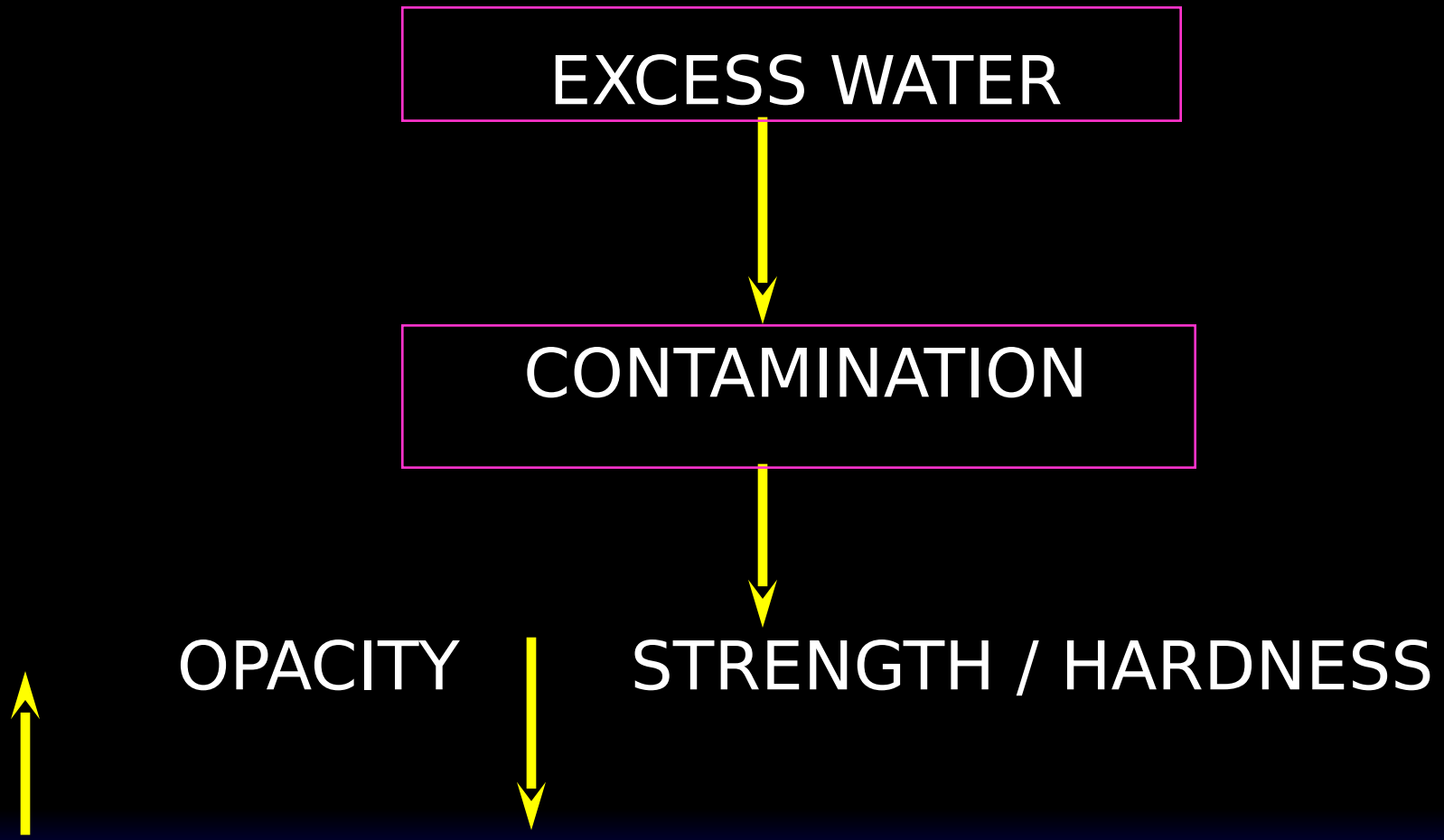
WHAT ROLE DOES WATER PLAY?

SLOWLY HYDRATES THE MATURE CROSS-LINKED MATRIX

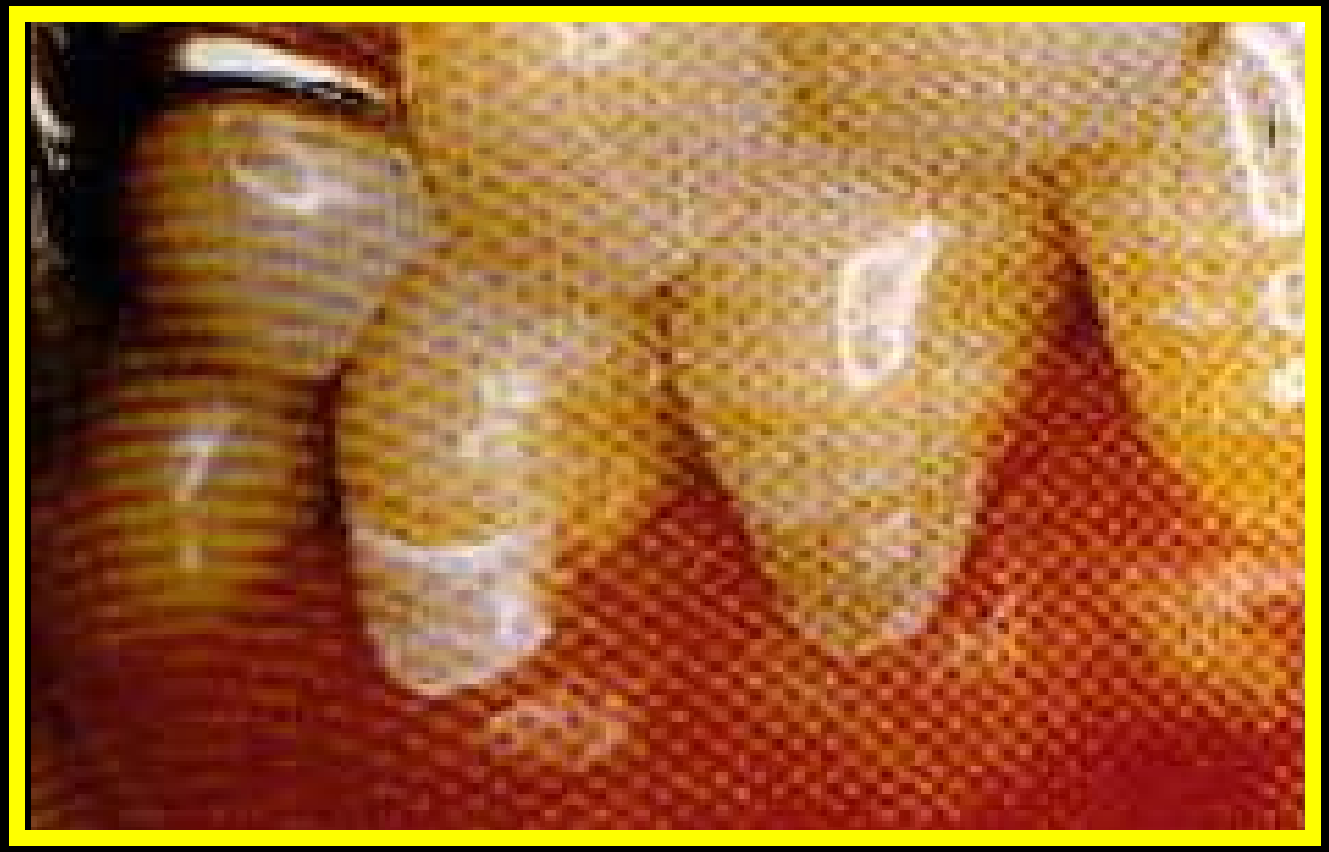
- INCREASE STRENGTH
- IMPROVED TRANSLUCENCY
- INCREASED RESISTANCE TO DESICCATION

CONVENTIONAL GLASS IONOMERS

MOISTURE SENSITIVE

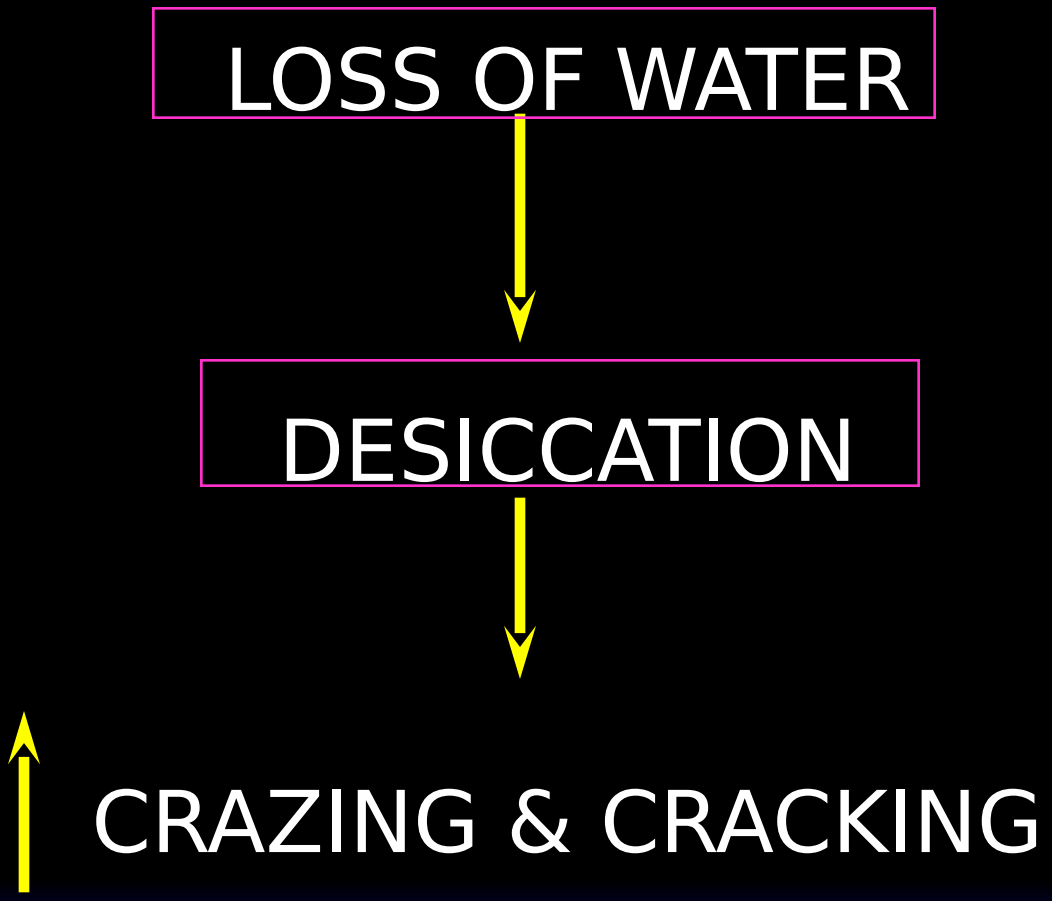


WATER CONTAMINATION



WATER CONTAMINATION

MOISTURE SENSITIVE



WHAT' NEW?

- KETAC-MOLAR (ESPE)
- FUJI IX (GC)

- IMPORTANT IN THIRD WORLD COUNTRIES
- ALTERED PARTICLE SIZE / SETS FASTER

RESIN-MODIFIED GLASS IONOMERS

ADVANTAGES

- TOOTH COLORED
- IMPROVED ESTHETICS
- MEDIUM FLUORIDE RELEASE
- “RECHARGES”
- SHORTER SETTING / LONGER WORKING
- DECREASED MOISTURE SENSITIVITY
- IMPROVED TENSILE STRENGTH

ADVANTAGES

- SETS ON COMMAND
- BETTER WEAR CHARACTEISTICS
- EASIER TO USE
- HIGHER BOND STRENGTH TO COMPOSITE
- FEWER STEPS THAN COMPOSITE
- CAN FINISH IMMEDIATELY

DISADVANTAGES

- LOW / MED MECHANICAL PROPERTIES
- LESS ESTHETIC COMPARED TO COMP
- MIXING MAY BE REQUIRED
- MORE DIFFICULT TO USE
- STICKY CONSISTENCY
- SENSITIVE TO DEHYDRATION
- NOT APPROPRIATE FOR STRESS BEARING AREAS

RECOMMENDED USES

- CLASS III AND V RESTORATIONS IN ADULTS
- CLASS I IN CHILDREN
- HIGH CARIES - RISK PATIENTS
- SANDWICH CLASS II
- POST-RADIATION PATIENTS (?)

COMPOSITION

BASICALLY

RMGI'S ARE GLASS IONOMER CEMENTS WITH THE ADDITION OF A SMALL QUANTITY OF RESIN COMPONENTS.

THE RESIN IN SET CEMENT = 4.5 - 6%.

SETTING REACTION

① ACID-BASE REACTION
② POLYMERIZATION REACTION

TWO RESIN MODIFICATIONS TO GICs

- LESS WATER - IT IS REPLACED BY A WATER / HEMA MIXTURE. (VITREMER)

- MODIFICATION OF THE POLYACID WITH SIDE CHAINS THAT CAN POLYMERIZE BY LIGHT-CURING MECHANISMS.

  (FUJI II LC & PHOTAC-FIL)

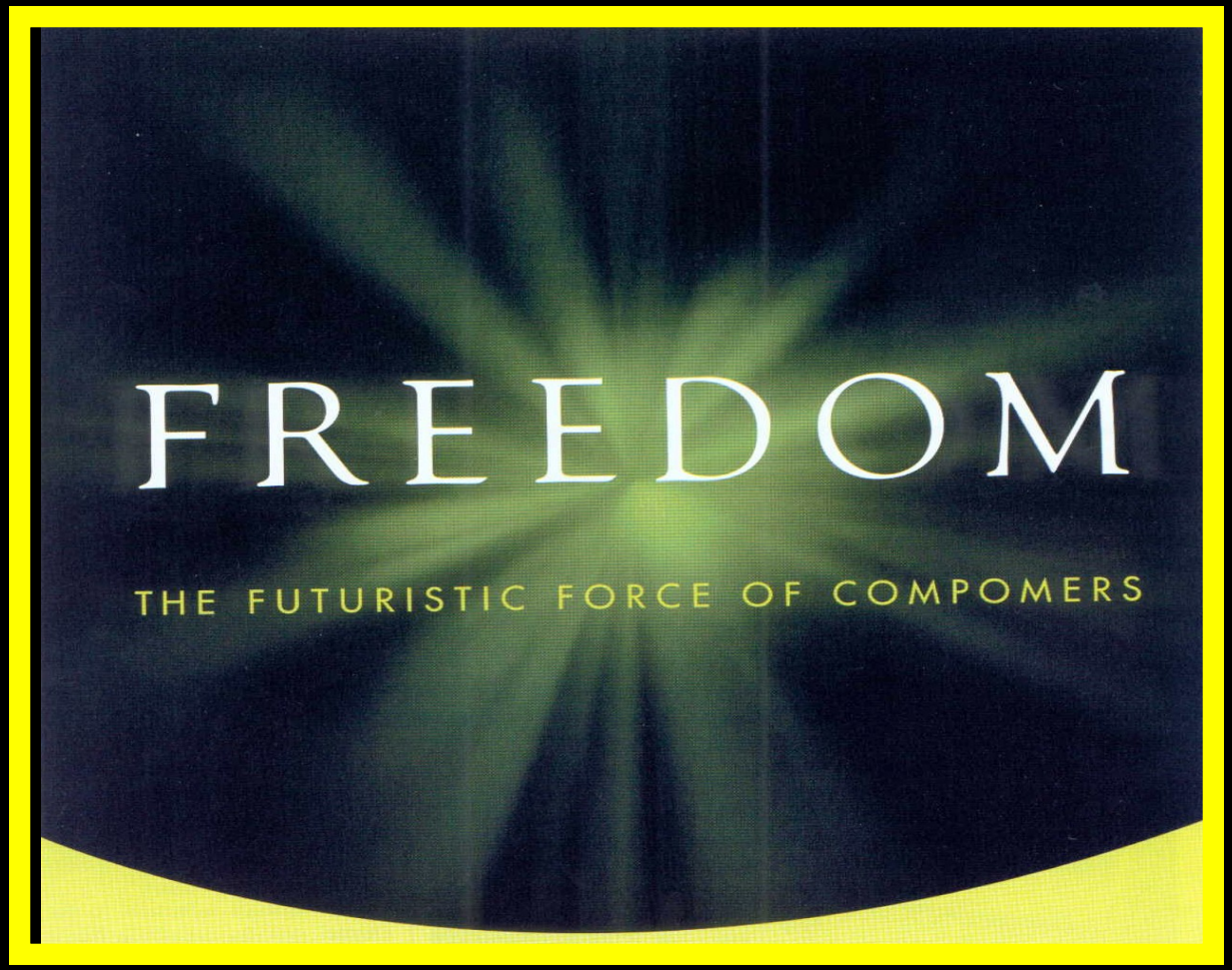
TIMING OF THE SETTING REACTION

1ST - LIGHT CURING REACTION

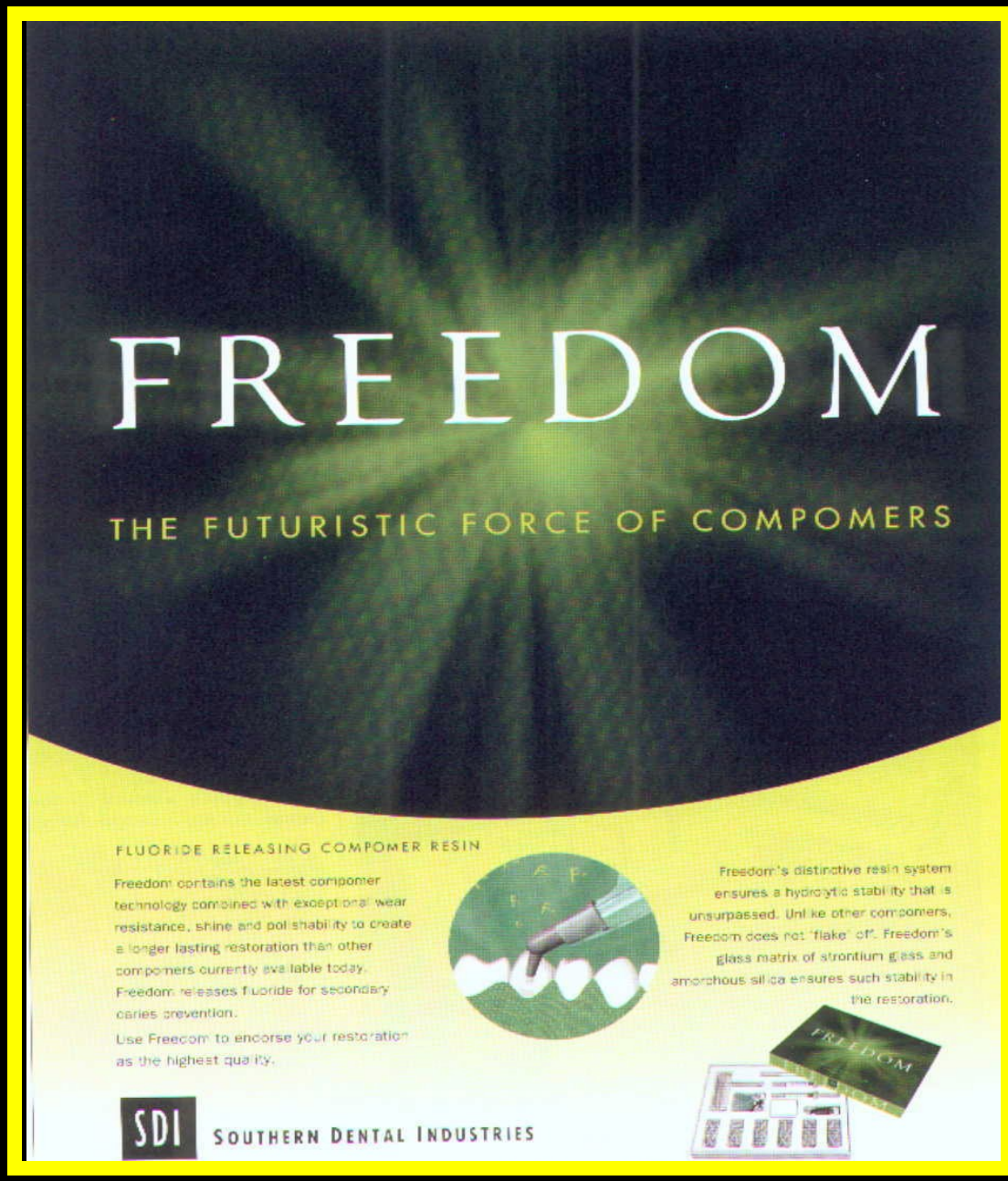
2ND - SLOW ACID - BASE REACTION

POLYACID - MODIFIED COMPOSITE RESINS

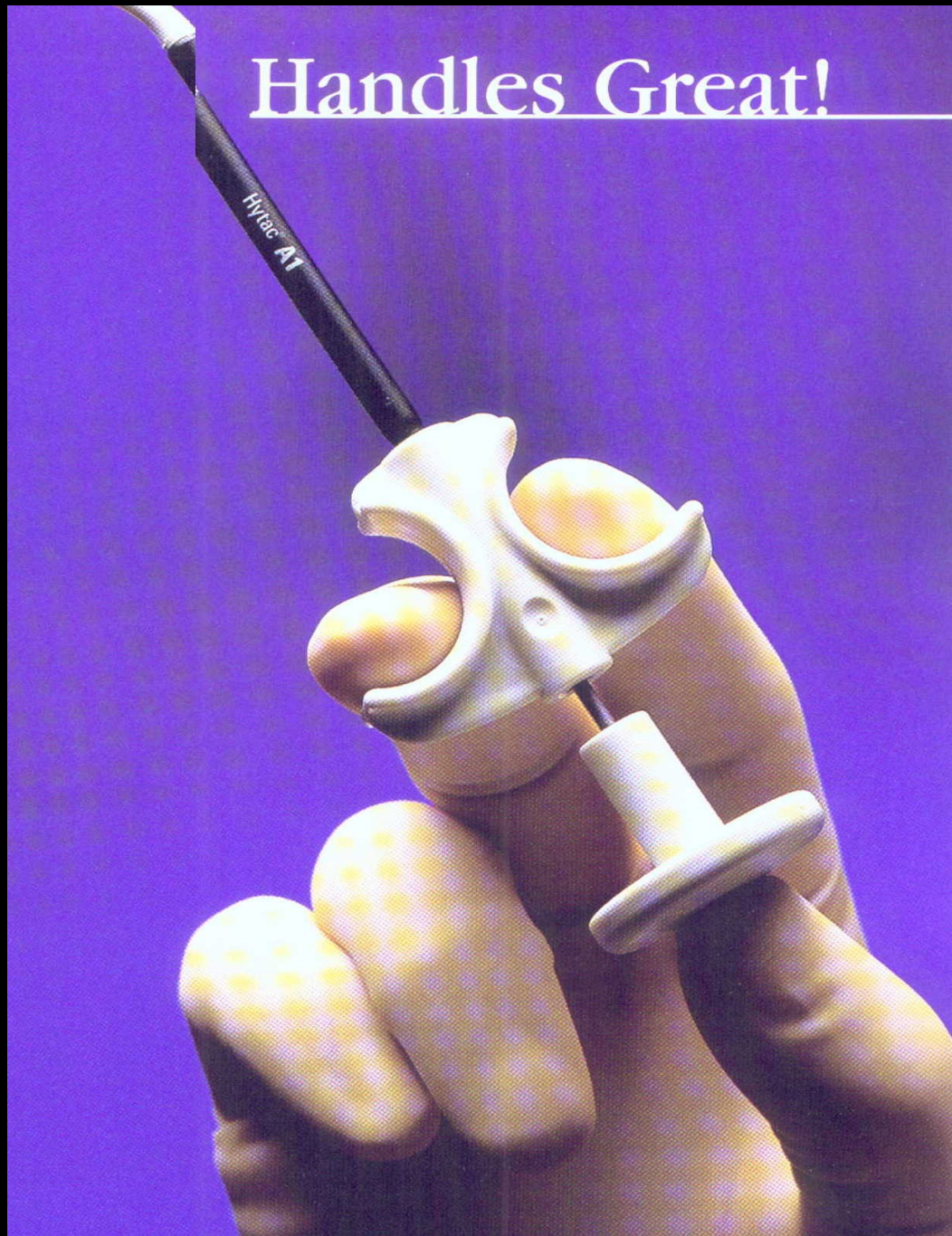
POLYACID - MODIFIED COMPOSITE RESINS



POLYACID-MODIFIED COMPOSITE RESINS


FREEDOM
THE FUTURISTIC FORCE OF COMPOMERS
FLUORIDE RELEASING COMPOMER RESIN
Freedom contains the latest compomer technology combined with exceptional wear resistance, shine and polishability to create a longer lasting restoration than other compomers currently available today. Freedom releases fluoride for secondary caries prevention.
Use Freedom to encorse your restoration as the highest quality.
Freedom's distinctive resin system ensures a hydrolytic stability that is unsurpassed. Unlike other compomers, Freedom does not "flake" off. Freedom's glass matrix of strontium glass and amorphous silica ensures such stability in the restoration.
SDI
SOUTHERN DENTAL INDUSTRIES

POLYACID-MODIFIED COMPOSITE RESINS



ADVANTAGES

- EXCELLENT HANDLING PROPERTIES
- FINISHES EASY
- GOOD ESTHETICS
- DECREASED MOISTURE SENSITIVITY
- MED / LOW FLUORIDE RELEASE

DISADVANTAGES

- PHYSICAL PROPERTIES THAT ARE LESS THAN COMPOSITE
- LONG TERM CLINICAL USEFULNESS IS UNKNOWN
- LESS FLUORIDE RELEASE
- NO “RECHARGE”

DISADVANTAGES

- REQUIRE A BONDING AGENT TO BOND TO TOOTH STRUCTURE
- INCREMENTAL PLACEMENT
- WEARS MORE THAN COMPOSITE
- MUST BE LIGHT-CURED

RECOMMENDED USES

- CLASS II AND V RESTORATIONS IN ADULTS
- CLASS I AND II IN CHILDREN
- MEDIUM CARIES - RISK PATIENTS

DYRACT AP - CAULK RECOMMENDS USE FOR "ALL" CLASSES OF RESTORATIONS.

REALITY NOW

"THIS SEEMS LIKE AN AWFULLY BIG LEAP OF FAITH."

"COMPOMERS ARE VERY POPULAR EVEN THOUGH WE HAVE QUESTIONED WHY ANY DENTIST WOULD USE A COMPOMER INSTEAD OF A COMPOSITE"

CHRISTENSEN

"WORKING CHARACTERISTICS OF COMPOMERS ARE EXCELLENT.....

HOWEVER, COMPOMERS HAVE PROPERTIES THAT ARE LESS ACCEPTABLE THAN COMPOSITE.....

CHRISTENSEN

"COMPOMER IS SO MUCH EASIER TO USE THAN RMGIs THAT IT IS NOW BEING USED IN NEARLY ALL RESTORATIVE SITUATIONS IN WHICH ITS OVERALL PHYSICAL PROPERTIES ARE ADEQUATE."

NEW CONVENTIONAL GLASS IONOMER

PHOTAC-FIL VS KETAC-FIL

- 29 Pairs of Restorations
- Compared 6 Different Categories
  - Retention
  - Marginal Discoloration
  - Anatomic Form
  - Color Match
  - 2^0 Caries
  - Marginal Adapt

Brackett WW, Gilpatrick RO, Browning WD, Gregory PN. Two-year clinical performance of a resin-modified glass-ionomer restorative material. Operative Dentistry 1999 Jan-Feb;24:9-13.

PHOTAC-FIL VS KETAC-FIL

- No Statistically Significant Difference in the 6 Categories.
- RMGI - Advantages of Improved Esthetics & Faster Application were Not Evident.
- Initial Color was Better / 24 months - Same

Brackett WW, Gilpatrick RO, Browning WD, Gregory PN. Two-year clinical performance of a resin-modified glass-ionomer restorative material. Operative Dentistry 1999 Jan-Feb;24:9-13.

CLINICAL EVALUATION OF COMPOMER

- *1 Year Evaluation* (Dyract)
- 41 Restorations
  - 36 Cervical Areas
  - 5 Interproximal Anterior Restorations

Tyas MJ. Clinical Evaluation of a Polyacid-Modified Resin Composite (Compomer). Operative Dentistry 1998;23:77-80.

CLINICAL EVALUATION OF COMPOMER

- Retention Rate 97%
- 1 Lost Restoration / 8 Marginal Discoloration (19%)
- Excellent Color Match

Marginal Discoloration = Bond Deterioration ?

Tyas MJ. Clinical Evaluation of a Polyacid-Modified Resin Composite (Compomer). Operative Dentistry 1998;23:77-80.

3-YEAR CLINICAL EVALUATION

- Dyract/Fuji II LC/Hybrid Composite
- 50 Patients / 154 Class III Rests
- Evaluations
  - Baseline, 6 Months
  - 1,2,3 Years

Van Dijken, JW. 3-year clinical evaluation of a compomer, a resin-modified glass ionomer and a resin composite in Class III restorations. American Journal of Dentistry 1996 October;9(5):195-198.

3-YEAR CLINICAL EVALUATION

- 2 Restorations Replaced
- Composite - Best Color Match
- Higher Marginal Discoloration for RMGI & Compomers
- RMGI Had Greatest Color Change and the Highest Surface Roughness

Van Dijken, JW. 3-year clinical evaluation of a compomer, a resin-modified glass ionomer and a resin composite in Class III restorations. American Journal of Dentistry 1996 October;9(5):195-198.

SETTING REACTION

- PRIMARILY LIGHT INITIATED FREE RADICAL POLYMERIZATION
- THOUGHT OF AS LOW FLUORIDE RELEASING COMPOSITE RESINS
- MIXING DOES NOT PRODUCE AN ACID-BASE REACTION

TWO RESIN MODIFICATIONS TO GICs

- DIRECT REPLACEMENT OF POLYACID WITH POLYMERIZABLE MONOMER (GERISTORE, VARIGLASS)
- SUBSTITUTION OF ACIDIC POLYMERIZABLE MONOMERS FOR POLYACID (DYRACT, COMPOGLASS)

COMPOMER

A RESTORATIVE MATERIAL THAT COMBINES THE FEATURES OF A COMPOSITE AND GLASS IONOMER.

CLINICAL TIPS FOR COMPOMERS

- Etch Tooth Structure With Phosphoric Acid for Highest Bond Strength
- Place Several Layers of Primer on Tooth
- Place and Light Cure in 1-mm Increments

RECOMMENDED USES

- CLASS III AND V IN ADULTS
- CLASS I AND II IN CHILDREN
- CLASS II - SANDWICH TECHNIQUE
- MEDIUM CARIES - RISK PATIENTS

DYRACT AP - CAULK RECOMMENDS USE FOR "ALL" CLASSES OF RESTORATIONS.